

LVIII.—On the Occurrence of *Gobius capito*, C. & V., in Cornwall. By FREDERICK PICKARD-CAMBRIDGE, B.A., F.Z.S.

[Plate XXX.]

It is now four years ago since Mr. G. A. Boulenger made the interesting discovery of this fine goby at Concarneau and in the Gulf of St. Malo (Ann. & Mag. Nat. Hist. ser. 7, vol. iv. p. 229, 1899), a species hitherto recorded only from the Mediterranean. It occurred to him at the time that it was quite possible that this fish might also be found on our side of the Channel, and his surmise was strengthened by the recollection that Couch, in his 'Fishes of the British Islands,' vol. ii. p. 153, had stated that he had seen gobies of 9 inches in length in the rock-pools on the coast of Cornwall, presumably near Polperro. These fish, however, this author had referred to *Gobius niger*, Linn., considering that their large size was due to their isolation in the deep pools lying above the ordinary neap-tides and to the abundance of food found in these places. Boulenger communicated his suspicions to Messrs. Holt and Byrne, of the Department of Agriculture and Technical Instruction for Ireland, who were engaged in a Report on the Sea and Inland Fisheries of Ireland, which was published early this year (1903), and contains an admirable monograph of the "Gobiidæ," including some excellent plates.

For some reason or other, however, the giant goby, *G. capito*, which Messrs. Holt and Byrne refer to in their monograph, had not, in spite of a great deal of laborious collecting and observation on the coast of Ireland and in Devonshire and Cornwall, surrendered itself to science until the August of this year, when I was myself fortunate enough to find them in abundance at Port Scatho, on the coast of Cornwall, between Falmouth and Fowey.

Mr. Boulenger had often begged me to look out for gobies on my sea-fishing expeditions and rambles along the coast, and especially urged me, just before visiting Cornwall, to see if possible what these large gobies might be. It is curious that no one else should have come across them previously, because those that Couch records were probably found at Polperro; and if so, they most likely occur all along that coast. Holt and Byrne distinctly point out that *G. niger* is an estuarine species, never found in rock-pools, and also that the extreme length attained by *G. paganellus*, the rock-pool

goby *par excellence*, is about 5 inches. The chances of finding a *paganellus* 9 inches long, or, perhaps, an unrecorded species, would have induced those interested, one would have supposed, to have made a definite raid on the rock-pools of Polperro.

It is quite possible, of course, that *G. capito* is very local, for where it occurs it is abundant, and when of large size a very conspicuous fish. Specimens of from 7 to 9 inches in length would dart away to their hiding-places directly one showed oneself over the fringing rocks around any of those deep pools whose position and character Couch has so well described. Certainly to the casual observer specimens of 4 or 5 inches would not at a glance be distinguished from *G. niger*; but the broader, more inflated head, darker colour (in preserved specimens), and different markings of these rock-pool gobies arrest attention at once.

The greater width between the eyes and the free lateral lobes on the anterior membrane of the ventral fin are not, however, so marked as in the larger adult specimens. It is strange also, and perhaps the fact lends colour to the possibility of the restricted localization of this species, that in these pools, and, indeed, in all the tidal pools along the coast, not a single specimen of *G. paganellus* was taken.

Perhaps the pools are not large enough for both species to exist together in amity, possibly *G. capito* will not tolerate neighbours of another colour in his special pools; and if so, one can well understand that poor *paganellus* would go to the wall, or, more probably, down his cousin's throat, for *capito* is very strong, much larger, and with a healthy appetite.

In a single large pool on the upper rocks, reached only by the spring-tides, there must have been twenty or thirty of the giant goby. Like all the gobies, they are very voracious, dashing out and seizing anything that appears to them eatable, retiring to their dens to discuss the morsel at leisure. Otherwise they are exceedingly shy, and even a hand held up above the pool from behind the rocks against the sky-line will scare them to their deep retreats in one or other far corner of the pool. These holes are often a couple of feet deep, and at a time of general alarm become half-filled with gobies of all sizes which rush to them for shelter.

As soon as everything has quieted down, one by one the smaller fish sally forth again, but it is only with very great caution that the larger and more experienced will adventure themselves outside. First the snout, then very slowly the broad flat head and watchful eyes appear at the entrance of

the hole, and gradually the great grey goby slides down into deep water, resting motionless at the bottom and almost lost to sight, so well do the mottled tints assimilate with the rocks and stones at the bottom of the pool.

The ventral fin has all the appearance of a sucker, but observations tend to the conclusion that it has no adhesive power, but is merely tactile in its function. The fish are excellent eating by all accounts, and when of large size are worth the trouble of cooking.

A detailed description of this giant goby is given below, with a few notes on the other two more nearly allied species, with a key to their differential characters.

Key to the Species referred to in this paper.

- A. Size of adults larger, reaching from 7-9 inches long. Lateral margin of anterior membrane of ventral fin free, forming either a pointed (immature) or rounded (adult) lobe. Interorbital space only slightly less than the transverse diameter of the eye *G. capito*, C. & V.
- B. Size of adults smaller, never longer than 5 inches. Lateral margin of anterior membrane of ventral fin not free. Interorbital space scarcely wider than one fourth the transverse diameter of the eye.
- a. First dorsal with a yellow or orange marginal band. Scales smaller, not less than 50 in longitudinal series on the lateral line. Median rays of first dorsal not prolonged. Filiform rays on upper margin of pectorals more numerous, 12 *G. paganellus*, Linn.
- b. First dorsal without marginal band. Scales larger, not more than 42 in longitudinal series. Median rays of first dorsal prolonged. Filiform rays of pectorals less numerous, 4 or 5 *G. niger*, Linn.

Gobius capito, Cuv. & Val. (Pl. XXX. figs. a, b, & c.)
(Giant or Big-headed Goby.)

1836. *Gobius capito*, Cuv. & Val. Hist. Nat. Poissons, t. xii. p. 21.
1836. *Gobius limbatus*, Cuv. & Val. *loc. cit.* p. 345, fig. 345 (sec. Steindachner).
1840. *Gobius exanthematosus*, Nordm. in Demid. Voy. Russ. Mérid. iii. p. 423, Poiss. pl. x. fig. 1.
1863. *Gobius niger*, Couch, Fishes of the British Islands, vol. ii. p. 153, figure.
1861. *Gobius capito*, Günther, *loc. cit.* vol. iii. p. 55.
1881. *Gobius capito*, Moreau, Hist. Nat. Poissons de France, t. ii. p. 203, fig. 102.

1899. *Gobius capito*, Boulenger, Ann. & Mag. Nat. Hist. ser. 7, iv. p. 229.

1899. *Gobius capito*, Holt, Ann. Mus. Marseille, v. p. 43.

1903. *Gobius capito*, Holt & Byrne, Rep. Sea and Inland Fisheries of Ireland for 1901, pt. ii. p. 46.

Of this grand species Cuvier and Valenciennes say:—
 “La membrane antérieure de sa ventrale, qui est fort épaisse, a de chaque côté un lobe arrondi, ce qui la rend comme trilobée.” And this, indeed, is the character which infallibly distinguishes it from either *G. niger* or *G. paganellus* in examples of the same size, though when adult *G. capito* is twice as large as either of these species. In immature examples, however, the lobe is not rounded, but sharp.

Description.

Dimensions.—The adult male reaches the length of from 9 to 10 inches. Twenty examples from the same pool varied from 7 to $2\frac{1}{4}$ inches. The head very broad, with cheeks dilate, is rather less than one fourth the total length, is slightly longer than broad, and is slightly broader than deep. The dorsal fin at its base is exactly one half the length of body exclusive of the caudal fin. The pectoral fin is as long as the head is broad; the ventral fin is as long as the first dorsal is at its base and exactly the length of the anal fin. The interorbital space in adult examples is rather less than the diameter of the eye, but is much narrower in proportion as the examples diminish in size. The caudal peduncle is in width about one tenth the total length.

Scales.—The total number in longitudinal series from the base of the pectoral fin to the caudal fin along the median lateral line is from 65–68, always more than 60; in transverse series from the base of the posterior ray of the second dorsal fin to the posterior ray of the anal from 15–16 scales. The squamation of the head ceases at a line drawn tangential to the posterior margins of the eyes, and the upper part of the operculum is slightly squamose. The first dorsal fin has 6 rays, the medians not noticeably longer than the rest; the second dorsal has 15 rays; the caudal is rounded, nearly circular when fully spread. The anal fin has 12 rays. The first 10 or 12 rays of the upper margin of the pectorals are filiform. The ventral fin is nearly circular, the anterior membrane being detached at its posterior margin, forming on each side a blunt rounded lobe in the adult and a sharply pointed lobe in the immature.

Coloration.—Very variable in different individuals, ranging from pale orange-pink or sandy to sooty black. Freshly

caught examples are beautifully mottled with various markings of different shades of grey, thus closely assimilating with the rocks and gravel of the pools which they frequent.

In preserved examples the beautiful gradations of colour vanish and the markings become more distinctly differentiated.

All the fins except the ventral are pale, with more or less irregular rows of transverse, chevron-like, sooty-black blotches. The caudal fin has four or five irregular transverse bars of chevron-like sooty-black blotches; in the anal fin the blotches are very pale. The ventral fin is pale in some examples, more sooty in others, when it is seen to be minutely speckled with black. Pectoral fins with a dark basal suffusion and transverse bands, more or less regular, of chevron-like dark blotches.

The head is dark sooty black above, the cheeks and operculum being richly blotched with black. The dorsal area is deeply suffused with black blotches, which extend irregularly down the sides and across the lateral line, terminating along the belly in a row of distinct irregular blotches from the pectoral fin to the tail. The central lateral area of the caudal peduncle is marked with three elongate, wedge-shaped, black blotches. Ventral area sometimes pale, often sooty, when it becomes minutely speckled with black.

This species may be distinguished from *G. niger*, (1) by the free lateral lobe on the anterior membrane of the ventral fin, (2) by the smaller size of the scales, (3) by the greater width between the eyes, and (4) by the median rays of the first dorsal not being prolonged; from *G. paganellus*, (1) by the absence of the yellow band on the margin of the first dorsal, (2) by the lateral free lobe of the ventral fin, and (3) by the more numerous scales in longitudinal and transverse series.

The following represent the measurements of four examples of this species:—

	B.	Tot.	H.	Sn.	E.	Io.	Dp.	Cp.	Fin-rays.				Scales.	
									1st D.	4th Ray.	2nd D.	An.	Long.	Trans.
♂. 1.	150	188	45	15	8	7	37	19	VI	21	15	12	65	15
„ 2.	158	195	48	15.5	9	7	38	24	VI	23	15	12	68	15
♀. 3.	125	150	38	13	7	6	28	17	VI	17	15	12	65	15
„ 4.	88	101	27	9	4.5	3	20	11	VI	13	15	12	66	15

Gobius paganellus, Linn.
(Rock-Goby.)

1758. *Gobius paganellus*, Linn. Syst. Nat. ed. x. t. i. p. 263.
 1836. *Gobius paganellus*, Cuv. & Val. Hist. Nat. Poiss. t. xii. p. 22 (sec. Moreau).
 1839. *Gobius niger*, Thompson, Ann. & Mag. Nat. Hist. vol. ii. p. 417 (sec. Günther).
 1863. *Gobius paganellus*, Couch, Fishes of the British Islands, ii. p. 157, fig. 99.
 1880. *Gobius paganellus*, Day, Fishes of Great Brit. and Irel. i. p. 162, pl. lii. fig. 2.
 1881. *Gobius paganellus*, Moreau, Hist. Nat. Poissons de France, ii. p. 225.
 1897. *Gobius paganellus*, Beckford, Proc. Dors. Nat. Hist. Field-Club, xviii. p. 27.
 1898. *Gobius paganellus*, Holt & Byrne, Journ. Mar. Biol. Assoc. v. p. 335.
 1903. *Gobius paganellus*, Holt & Byrne, Rep. Sea and Inl. Fisheries of Ireland, p. 45, pl. i. figs. 1 (♀), 2 (♂).

It is fairly evident from Linnæus's diagnosis that the species attributed to this name by Cuvier and Valenciennes is in all probability that which the older author characterized, for he says: "lutea transversa in summo pinnæ dorsalis primæ." Cuvier remarks: "le bord de la nageoire porte toujours une large bande d'un jaune citron." This, indeed, is the best character by which the species may be distinguished at a glance from *G. niger* or *G. capito*.

Holt and Byrne give a detailed description, but the following characters may be pointed out. It may be distinguished from *G. niger*, (1) by the yellow or orange upper marginal band on the first dorsal, (2) by the smaller size of the scales, not less than fifty in longitudinal series, (3) by the normal length of the median rays in the first dorsal, and (4) by the greater number of the filiform rays on the upper anterior margins of the pectorals; from *G. capito* it may be recognized, (1) by the yellow marginal band on the first dorsal, (2) by the slightly larger scales, about 68 in *G. capito*, longitudinal series, (3) by the anterior membrane of the ventral fin being united throughout, (4) by the less proportional width of the interorbital space, and (5) by the adult being limited to $4\frac{3}{4}$ inches total length.

Holt and Byrne regard this species as entirely confined to rock-pools between the tides; not, like *G. niger*, an estuarine species. It occurs from the north of Ireland and Scotland to the south coast of England.

The following measurements represent those of a male of rather less than full size:—

♂.	B.	Tot.	H.	Sn.	E.	Io.	Dp.	Cp.	Fin-rays.				Scales.	
									1st D.	4th Ray.	2nd D.	An.	Long.	Trans.
	87	105	26.5	7	6.5	1.75	19	12	VI	11	15	13	56	12

Gobius niger, Linn.
(Black Goby.)

1758. *Gobius niger*, Linn. Syst. Nat. ed. x. t. i. p. 362.
 1836. *Gobius niger*, Yarrell, British Fishes, vol. i. p. 251 (ad partem).
 1836. *Gobius britannicus*, Thompson, P. Z. S. p. 61.
 1863. *Gobius niger*, Couch, Fishes of the British Islands, vol. ii. p. 153 (ad partem).
 1880. *Gobius niger*, Day, Fishes of Gt. Brit. and Irel. vol. i. p. 163, pl. lii. fig. 3.
 1881. *Gobius niger*, Moreau, Hist. Nat. Poiss. de France, ii. p. 230.
 1891. *Gobius niger*, Petersen, Fiskeri-Beretning Kbhvn. p. 244, pl. v. fig. 5.
 1893. *Gobius niger*, Smitt, Scandinavian Fishes, pt. 1, p. 245, pl. xii. figs. 3-5.
 1897. *Gobius niger*, Beckford, Proc. Dors. Nat. Hist. Field-Club, xviii. p. 27.
 1903. *Gobius niger*, Holt & Byrne, Report of Sea and Inland Fisheries of Ireland for 1901, p. 43, fig. 1.

It is not possible to tell from Linnæus's diagnosis alone exactly to which species he gave the name *niger*, for he merely says: "pinna dorsi secunda radiis quatuordecim." The question has, however, been already settled, so far as it can be, by the Scandinavian authors, whose identification we must accept.

There is no reasonable doubt that the gobies usually identified as *G. niger* by modern English authors are identical with those described under that name by Petersen and Smitt, and the species has been so thoroughly described by Holt and Byrne, in their admirable monograph of the gobies of Great Britain and Ireland, that further description seems unnecessary.

One might, however, mention a few of the characters in which this species differs and may be recognized from either *G. paganellus* or *G. capito*.

Total length of full-grown examples 5 inches. Boulenger (Ann. & Mag. Nat. Hist. 1899, ser. 7, vol. iv. p. 229) quotes Mr. Allen of Plymouth to this effect. Holt and Byrne (*loc. cit.*) also give "about 5 inches" as the usual adult length, and I have before me examples of the male from Poole Harbour, Dorset, which also reach 5 inches.

The males of the gobies are to be recognized by the urogenital papilla being more attenuate and terminating in a point, whereas in the female it is broader and truncate or excavo-truncate at the apex. In the former sex of the present species also the third, fourth, and fifth rays of the first dorsal fin are usually prolonged, the fourth being, in one male from Poole, an inch and a quarter in length. They vary, however, with individuals, while the rays are only slightly prolonged and filiform in the female sex.

In *G. paganellus* the rays are not prolonged in either sex.

The scales are much larger in *G. niger* in proportion to its size than in either *G. paganellus* or *G. capito*, there being never more than forty, counting longitudinally from the base of the pectoral fin, along the lateral line, to the caudal fin. In a transverse line, counting obliquely forwards from the posterior ray of the second dorsal to the posterior ray of the anal, there are not more than nine scales, while in a 5-inch example a scale removed from the median line at this spot measured 3.75 millim. across. In the other two species a scale from an example of the same length measures about 2 millim. across; while there are not less than fifty scales in longitudinal series in *G. paganellus* nor less than sixty in *G. capito*.

The ventral fin resembles that of *G. paganellus* in having the anterior membrane united along its lateral margins, not free and bluntly pointed as in *G. capito*.

The first dorsal fin has no pale orange or yellow marginal band, as has *G. paganellus*.

The interorbital space is scarcely more in width than one fourth the transverse diameter of the eye.

So that *G. niger* may be distinguished from the latter species in both sexes by (1) the absence of any marginal orange band on the first dorsal fin, (2) by the larger size of the scales, and (3), in the male sex and to some extent the female, by the prolonged middle rays of the first dorsal fin.

It may be recognized from *G. capito*, in all ages of the latter, (1) by the anterior membrane of the ventral fin being united throughout its margin, (2) by the larger size of its scales, (3) by the less proportional width of the interorbital space, (4) by the prolongation of the median rays of the first dorsal, and (5) by the smaller adult size.

The following measurements of eight examples from Poole Harbour, Dorset, taken in October, will confirm the above characterization of the species:—

	B.	Tot.	H.	Sn.	E.	Io.	Dp.	Cp.	Fin-rays.				Scales.	
									1st D.	4th Ray.	2nd D.	An.	Long.	Trans.
♂. 1.	100	125	23	6	8	2	18	11	VI	23	13	12	37	8
„ 2.	95	115	19	4.5	7	2	18	11	VI	32	13	12	38	8
„ 3.	95	115	19	4.5	7	2	18	11	VI	19	13	12	37	8
„ 4.	77	92	18	4	5.5	1.5	14	8	VI	16.5	14	11	38	8
♀. 5.	90	112	17.5	4	7	2	18	10	VI	14	14	12	39	8
„ 6.	82	100	16	3.5	5.5	1.5	16	8.5	VI	13	14	11	36	9
„ 7.	79	98	15	3	5	1.5	16	8.5	VI	13	14	12	39	9
„ 8.	79	98	15	3	5	1.5	16	8.5	VI	13	14	12	39	9

B. Body. Tot. Total length. H. Head. Sn. Snout. E. Eye. Io. Interorbital space. Dp. Depth. Cp. Caudal peduncle. 1st D. First Dorsal. 4th Ray. 2nd D. Second Dorsal. An. Anal. Long. Longitudinal series. Trans. Transverse series.

EXPLANATION OF PLATE XXX.

Fig. a. Gobius capito, profile view (female).

Fig. b. Ditto, from above.

Fig. c. Ventral fin of ditto.

LIX.—On a new Species of *Helictis*.

By J. LEWIS BONHOTE, M.A.

HAVING recently had occasion to go over the genus *Helictis*, I find that the form found in Cochin China differs from those hitherto described, and therefore requires naming.

I propose to call it

Helictis Pierrei, sp. n.

General colour above brownish clay (“mummy-brown” of Ridgw.), each hair having a whitish glistening tip, more conspicuous in some examples than in others. These light tips reach their maximum development in the tail, and so predominate over the terminal two thirds of its length as to